



# **New Horizons in Project Teams**

**David Gilman**

**Deputy Director for Project Execution  
Exploration and Flight Projects Directorate  
NASA Langley Research Center**



## **What Langley Has to Say About Project Teams That is New**

- ◆ **Langley experience is being adapted to working in a new project environment—subprojects in support of the Constellation Program and its major projects, Orion and Ares**
  - Experience with projects where Langley had primary responsibility
  - Experience supporting other Centers' projects
- ◆ **Langley's new approach is based on our support for the Shuttle Return to Flight effort**
  - Projectize Langley's support
  - Langley projects then integrate with their customers and partners in teams that include other Centers and their contractors
- ◆ **The benefits have included**
  - Application of disciplined project management and engineering to meet the needs of our customers
  - Continual improvement in a system of project management, engineering, and safety and mission assurance
  - Systematic adaptation to the management, engineering, and safety and mission assurance requirements of the Centers



# New Horizons at Langley

- ◆ Center commitment to strengthen flight project teams has been underway for 3 years
- ◆ Original plan was based on robotic missions with some support to the Space Shuttle program and other possible future human space flight projects



**CALIPSO**



**STS 114**



**STS 121**



**Planetary Aircraft**



# New Horizons at Langley

- ◆ Things changed dramatically in FY 2006 when Langley became responsible for several large activities in the Constellation Program

**Ares I-1  
Vehicle  
Integration**

**Ares I  
Engineering  
Support**



**Launch  
Abort  
System**

**Orion  
Advanced  
Technology**

**Flight Test  
Crew  
Modules**

**Support for Constellation  
Level I and Level II**



# New Horizons at Langley

## ◆ The Exploration projects brought challenges for project teams

- Langley has had to quickly staff up 6 project teams for human space flight projects over the last 9 months
  - Langley project teams cannot be fully staffed with people having human spaceflight experience
  - Langley project teams cannot deplete on-going support for the Space Shuttle and the Space Station
- Langley Exploration projects do not stand alone but are integral parts of the Constellation Program or one of its major projects
  - Langley project team performance is tied to their Constellation, Ares, and Orion customers
  - Langley project team performance also depends on success from around NASA and from NASA's contactors
- A project management system suitable for Exploration projects was urgently needed
  - Adapted from experience of projectizing Langley support for the Shuttle's Return to Flight



# Staffing the Project Teams

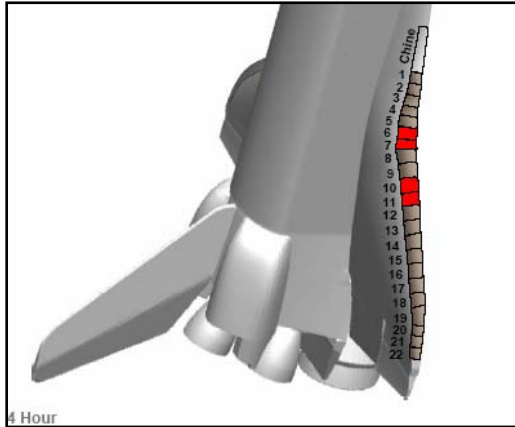
## ◆ What Langley had for its Exploration projects

- Technically excellent workforce, with experts in many disciplines and experience in flight, robotic space flight, and human space flight
- Cadre of experienced project management staff that had grown with recent successes
  - Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations (CALIPSO)
  - Geosynchronous Imaging Fourier Transform Spectrometer (GIFTS) Engineering Demonstration Unit
  - Planetary Aircraft Risk Reduction
  - X43-A
  - Shuttle Return to Flight
- Langley's Shuttle Return to Flight project had project management staff with recent human spaceflight project experience
- NASA Engineering and Safety Center (NESC) also has in-depth technical and management experience in the Shuttle Return to Flight

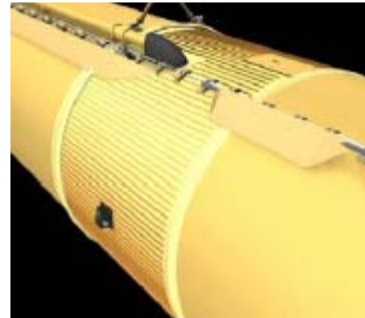




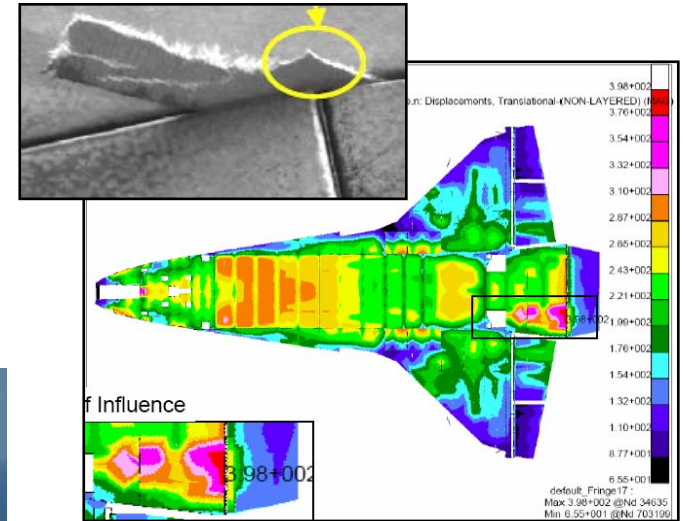
# Projectizing Support for Shuttle Return-to-Flight



Wing Leading Edge Sensors



External Tanks



Exposed Gap-filler  
Aerothermodynamic Modeling



EVA Infrared Camera System



STS-121  
Discovery  
Launched July 4th



Testing in 20" Mach 6 Tunnel



# Integrating Langley Project Teams with Teams in the Rest of the Constellation Program

- ◆ Langley has a long tradition of working with other NASA Centers and with contractors for mission success



## Planetary Atmospheric Flight Aerobraking and Entry, Descent, and Landing







# Integrating Langley Project Teams with Teams in the Rest of the Constellation Program

## ◆ Customer-Focused Teams

- Each Langley project is part of a Langley team focused on the needs of one of our major customers
  - Constellation Level 1 and 2
  - Orion Project
  - Ares Project
  - Space Operations
  - Space Missions
- Each customer-focused team includes
  - Leaders responsible for ensuring that Langley responds effectively to the customer's needs
  - A representative at JSC or MSFC to provide quick interactions between Langley and the customers



# Integrating Langley Project Teams with Teams in the Rest of the Constellation Program

## ◆ Integrating Langley project teams with partners and contractors

- Each project is responsible for a good, supportive, team relationship with the other NASA Centers and with the contractors who make up the Constellation program.
- Launch Abort System
  - Langley Project Manager is LAS Control Account Manager in the Orion Project
  - Deputy Project Managers is at MSFC
  - The project has established a good working relationship with the Prime Contractor and with the Sub-Contractor for the Launch Abort System
- Ares I-1 Vehicle Integration
  - While not directing the Ares I-1 Project, the Langley team leads the SE&I effort and coordinates all the activities leading to a successful test flight
  - Vehicle Integration representatives are on-site at MSFC, GRC, and the flight electronics contractor



# Integrating Langley Project Teams with Teams in the Rest of the Constellation Program

- ◆ **Integrating Langley project teams with partners and contractors**
  - Orion TPS Advanced Technology
    - The Langley project reports to the TPS Advanced Technology Project Manager at ARC
  - Orion Crew Module Simulator
    - The Langley project reports to the Abort Flight Test Project in the Flight Test Office of the Orion Project
    - Other partners in the Abort Flight Test Project include GRC, Dryden, and the Orion Prime Contractor



## **Developing the Langley Project Management System**

- ◆ **With the increased number of flight projects, we had a new urgency in developing a documented system of space flight project management and training people in it**
  
- ◆ **We have had help in the form of training and tools from many Centers and organizations**
  - NASA's Academy of Program/Project and Engineering Leadership program
  - Goddard Space Flight Center
  - Jet Propulsion Laboratory
  - Johnson Space Center
  - Marshall Space Flight Center



# Developing the Langley Project Management System

- ◆ **We have developed an Exploration Flight Project Practices handbook, based on the JPL Flight Project Practices handbook**
  - The handbook is a central component of our project management system
- ◆ **A number of modifications had to be made**
  - Requirements for teamwork with customers and partners had to be modified significantly
    - Match the teaming arrangements within NASA's Constellation Program
  - Requirements for applying NASA Procedural Requirements also had to be modified
  - The project life cycle had to be abstracted in order to apply both to technology development projects and to
  - A new section was added for the requirements applied to replanning a project
  - Links to JPL documents were replaced with links to NASA documents, Langley documents, and the Project Management Institute's Guide to the Project Management Body of Knowledge





## **Developing the Langley Project Management System**

- ◆ **As a result of all these changes, the handbook applies exclusively to Exploration projects at Langley and not to competitively won space science missions**
  - It is also applicable to some directed space project work, like the Mars Science Laboratory Entry Descent and Landing Instrument project



# Future

- ◆ **Langley has established a project performance guidance team to initiate and guide improvements in the project management system.**
  - Deputy Directors from all organizations involved in Exploration projects
- ◆ **The guidance team has commissioned two improvement teams to help the projects in FY 2007**
  - Project planning improvement team
  - Project controls improvement team
- ◆ **Langley has a strong lessons-learned activity that each project supports**
  - Capture lessons learned at major milestones
  - Review accumulated lessons learned annually for inclusion in the project management system
- ◆ **Langley is developing a Mission Flight Project Practices handbook which will serve as the central component of the project management system for projects where Langley has mission responsibility**



# Future

- ◆ Langley Exploration projects are also giving experience to managers and engineers at all levels in the Center
- ◆ We continue to be grateful to our counterparts around NASA for help in training our managers and engineers in the way you do space flight projects

